A Performance Based Weather Standard to Enable Scaling of BVLOS Operations Globally

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Session: Performance-driven UTM capabilities to support the growing variety of operations and scalability

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Why the Need for Performance Based Weather?

- The current aviation weather observation network lacks granular enough data from the surface to 5,000 feet to effectively measure winds, wind shear, IFR ceiling and visibility, icing and turbulence that impact low altitude beyond-visual-line-of-sight drone operations.

- This introduces weather risk and uncertainty for decision makers that costs money.

- We need more weather data.

- A performance-based standard, that includes weather data error rates and metadata, will allow for use of lower cost, novel science and technology to collect more ubiquitous weather data.

- It will incentivize the private sector to invest in novel methods, bringing market forces to what has traditionally been a government only domain.

ASTM Standard Specification for Performance for Weather Information Reports, Data Interfaces, and Weather Information Providers (WIPs)

A standard with the potential to unlock weather innovation and introduce the most transformational opportunity for weather data collection since Doppler Weather Radar in the early 1990s.

- Focus: Increase investment and access to reliable weather data--in-situ, remote sensor (wind lidar) and derived weather reports (e.g., camera imagery)
- Weather data performance standard supports risk-based decisions through vehicles like SORA
- Provides a structured 3rd Party Weather Provider (3PWPs) path to certification
- R&D required to develop certification requirements
- CAA and ANSP support and adoption key to success

Questions to Consider for Execution

- What can this mean for the future of aviation weather services?
- What is the 3PWPs path to provide reliable, secure weather data and services?
- How can aviation authorities test and demonstrate the standard for potential adoption?
- What methods and means of compliance are required for rulemaking consideration?
- How is data collected and analyzed (who, what, where, how) to understand the value proposition for the 3PWP and users?
- What are potential Public/Private Partnership business models?

Backed by science and experts that confirm the challenges of weather to the UAS/AAM Industry and the lack of adequate observation data.

Supporting Science & Research Publications

Campbell, S. E., D. A. Clark, and J. E. Evans, 2017: Preliminary Weather Information Gap Analysis for UAS Operations.

Houston, A. L., J. C. Walther, L. M. Pytlikzillig, and J. Kawamoto, 2020: Initial assessment of unmanned aircraft system characteristics required to fill data gaps for short-term forecasts: Results from focus groups and interviews. J Operational Meteorology 8, 111–120, https://doi.org/10.15191/nwajom.2020.0809

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Oke, T. R., 1976: The distinction between canopy and boundary-layer urban heat islands. http://dx.doi.org/10.1080/00046973.1976.9648422, 14, 268–277 https://doi.org/10.1080/00046973.1976.9648422

Reiche, C., R. Goyal, A. Hamilton, A. Cohen, J. Serrao, S. Kimmel, C. Fernando, and S. Shaheen, 2018: Urban Air Mobility Market. 1–162 pp

Schweiger, K., and L. Preis, 2022: Urban Air Mobility: Systematic Review of Scientific Publications and Regulations for Vertiport Design and Operations. Drones, 6, 179, https://doi.org/10.3390/drones6070179

Zhao, Y., R. Li, L. Feng, Y. Wu, J. Niu, and N. Gao, 2022: Boundary layer wind tunnel tests of outdoor airflow field around urban buildings: A review of methods and status. Renewable and Sustainable Energy Reviews, 167, https://doi.org/10.1016/j.rser.2022.112717

Thank You

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